

SUMMARY

This report describes a strategic planning process and outcomes addressing issues related to agriculture and water use in the South Valley, Bernalillo County, New Mexico. The strategic planning process started in mid-summer 2009 and culminated with a strategic planning workshop held October 19, 2012. The strategic planning process and outcomes are a component of the Improving Economic Returns and Long-Run Sustainability In a Rapidly Growing, Peri-Urban, Multicultural, Traditional Farming Community project sponsored by the New Mexico Agricultural Experiment Station at New Mexico State University, State of New Mexico State Appropriation Fund for South Valley Land Use Feasibility Study, and USDA-CSREES Small and Medium Size Farm Prosperity Agreement No. 2009-55618-05096. The project's components are:

1. Scientific data collection on technical agricultural aspects:
 - crop water use
 - current land use
 - weather
 - water quality
 - microclimate effects of irrigated agriculture
2. Social science data collection on:
 - economic characteristics of South Valley agriculture
 - economic impact of local agriculture
 - marketing information on locally grown food
3. Community-based strategic planning, which entails:
 - identifying agricultural land irrigators' perceptions about current agricultural issues and related social and environmental issues

- developing a strategic vision for the next five years and the respective strategic actions
- identifying the potential barriers and the necessary strategies

This report focuses on component 3. Other publications for this project are in progress and will be available at <http://aces.nmsu.edu/pubs/research/welcome.html>.

The project's strategic planning work was carried out in two stages: a pre-planning and a planning stage. The pre-planning work focused on identifying research needs, identifying and selecting strategic planning participants, and logistics and venue for the planning stage. All pre-planning work was carried out with the assistance of an advisory pre-planning work group selected using a community referencing process to identify knowledgeable individuals for participation. The pre-planning work started in mid-summer 2009 and finished with the October 2012 workshop. About 80 planning participants were identified via a nomination survey and face-to-face interviews. More than 50 were invited to participate in the planning workshop, and around 20 invitees participated in the development of the outcomes presented in this report.

INTRODUCTION

Population and economic growth throughout the United States have led to extensive conversion of agricultural land to non-agricultural uses over the last several decades (see http://www.farmlandinfo.org/agricultural_statistics/?RequestTimeout=999 for farmland conversion data from the U.S. Department of Agriculture's National Resources Inventory). Demand for large-lot homesites has increased the rate of agricultural land conversion and led to increased

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land fragmentation in some regions (Daniels and Bowers, 1997). The structure and character of urban fringe agriculture throughout the United States have also changed due to land conversion and the fragmentation of agricultural properties into rural residential or hobby farms and ranches operated by individuals not dependent upon agricultural income (Hoppe et al., 2007). The future of agricultural land is closely linked to the future of water resources (and vice versa), yet many rapidly growing urban areas in the western United States are located in irrigated river valleys. Advocates of traditional irrigated agricultural communities thus struggle to justify economic, historic, cultural, and lifestyle-based claims on combined land and water resources in the face of growing competition for these resources from non-agricultural users.

This situation is particularly acute in the Albuquerque, NM, metropolitan area, located in the arid Southwest, where both arable land and water are scarce. One of New Mexico's oldest traditional agricultural communities is known as the South Valley. This unincorporated community, located on the southern fringe of the Albuquerque metro area, has been home to irrigated agriculture for many centuries and is in the process of dramatic transformation. South Valley agricultural lands, agricultural irrigation water, and agrarian values and traditions are being replaced by suburban and urban land and water uses, with values and traditions also shifting from rural to urban. Lands that were once home to small, medium, and large farms producing a diverse mix of fruits, vegetables, grains, forages, irrigated pasture, and small-scale mixed livestock species have been converted into commercial and residential development. A few large farms continue to operate in the area, although the majority of farms in the South Valley are small to very small, and while their numbers are large, these farms contribute marginally to the value of total agricultural output and economic activity in the state. The majority of large-lot rural residences that continue to use irrigation water do so primarily for lifestyle and landscape purposes, often for the production of pasture or relatively low-valued forage.

The South Valley is a textbook example of what is called a peri-urban² community. A peri-urban area is a transition zone where urban and rural activities are occurring simultaneously and the landscape is changing rapidly. Peri-urban areas play a mediating role between rural and urban areas (Iaquinta and Drescher, 2002). The pressures of the peri-urban transition processes occurring in the South Valley have led some residents to organize for the purpose of addressing perceived threats to their traditionally agriculture-based community. Concerned community members believe that the South Valley's transition from rural to urban endangers the existence of agriculture and agricultural water users' claims on that scarce resource (Wang, 2007). These activists also believe that the peri-urban location of the South Valley provides opportunities for the development of a new agricultural economy and new agricultural traditions as well as the strengthening and preservation of old ones; thus, the activists have sought assistance in moving their community forward (Wang, 2007).

This paper describes and documents the development and implementation of a planning process involving South Valley residents, New Mexico State University (NMSU) staff, and other stakeholders to prepare for the future of the South Valley agricultural community. The planning process described here has been applied in a variety of settings; however, this paper will illustrate how the process is being used in a peri-urban community currently grappling with the rural-to-urban transition.

RURAL-TO-URBAN LAND USE TRANSITION

Urban development within agricultural communities can disrupt existing social, community, environmental, and ecological patterns, and impose a variety of costs on people, wildlife, water, air, and soil quality (Heimlich and Anderson, 2001). In addition, impermanence syndrome creates a disincentive for small-scale agricultural operations to invest, diversify, and make improvements to infrastructure (Berry, 1978), including those related to irrigation water conveyance and application.

² According to Peri-Urban Environmental Change (PUECH, available online at <http://www.scope-uk.ac.uk/projects/PUECHsumOct01.html>), peri-urban defines "...the transition or interaction zone, where urban and rural activities are juxtaposed, and landscape features are subject to rapid modifications, induced by anthropogenic activity. These critical areas of land cover change, leading to transformations in the hydrological, ecological, geomorphological and socio-economic systems, are often neglected by both rural and urban administrations. As cities develop, much of their growth is located in such areas."

Data for land use and land cover change in Albuquerque's South Valley from 1985 to 2009 are shown in Table 1.³ Over the past 25 years, the region experienced a 33% increase in urban land use, a 20% decrease in agricultural land use, and an 8% decrease in desert or barren area.⁴ The increase in urbanization in the South Valley is a result of commercial and residential development, as well as increases in surface area devoted to new roads and the driveways that access or are part of subdivisions and rural-residential home sites.

Land cover change data for the South Valley illustrate the shift in land use in the southern Albuquerque metro area, with the urbanized landscape increasing and agricultural and desert land areas decreasing over the last few decades. Historically, many South Valley producers grew high-value crops such as apples, grapes, chile peppers, and other orchard and vegetable crops. Today, most South Valley irrigated farms produce lower-valued and less management-intensive pasture grass, grass hay, and alfalfa. The majority of the community's households are dependent on off-farm income, both earned and unearned, and there is relatively little food produced for direct human consumption.

A previous study of South Valley residents' attitudes found that they believe agriculture and the ecosystem are inextricably linked, and that they (small-scale agricultural producers) are an integral part of the ecosystem and serve as producers of ecosystem goods and services ranging from the provisioning of food, fiber, and fresh water to the regulation of processes that affect air quality, climate, erosion control, and human diseases (Wang, 2007). Moreover, many South Valley citizens strongly recognize the landscape, open space, cultural, and social contributions of their small-scale farms and want to keep local agriculture sustainable in their community (Wang, 2007). The landscape shift from agriculture to urban is not viewed as necessarily bad by South Valley residents; however, they are

Table 1. Percentage and Area Changes of Land Cover Types, 1985–2009, South Valley, Albuquerque, New Mexico Metro Area

Land Cover Type	% Change	Area Change in km ²
	1985–2009	1985–2009
Urban	33.715	123.21
Agriculture	-20.954	-22.32
Water	-48.507	-4.58
Desert/Barren	-8.970	-96.32

interested in seeing a balanced mixture of rural and urban transition in their community (Wang, 2007).

A variety of alternatives are available to peri-urban transitional communities. One alternative is to remain passive and simply watch as the rural-urban transition takes place. Speculation in land and water values by traditional resource owners and users has contributed to this passivity, which can and has led to significant wealth capture once the resources are sold. However, not all peri-urban residents want to fatalistically accept the dramatic changes in their communities that the rural-urban transition brings, and instead envision a future with both traditional and new land uses and economic activities occurring simultaneously. These residents (often both old and new) want a community where local agriculture continues to exist and thrive and actively seek that alternative future (Wang, 2007).

Nationwide, mixed traditional and urbanized land uses have gained momentum in the last few years with the advent of the local food movement in response to concerns about food security, food quality, and the environmental impact of distant industrial food production. However, survival of local agriculture in a peri-urban area is most likely to happen if a community consciously plans for it, and such planning is less likely to be successful if it is top-down or driven by local government planning authorities (Wang, 2007).

Democratic, stakeholder-driven planning processes have been successful in numerous applica-

³ The land classification data in Table 1 were created using remote sensing analysis of Landsat 5 Thematic Mapper satellite images. The Landsat 5 images were acquired for 13 September 1985 and 1 October 2009 to illustrate change in land cover types over a 24-year period. Both images were taken during vegetation leaf-on periods and have homogeneous reflectance values. A maximum likelihood land classification technique within EVNI 4.7 software was used to classify five land cover types: agriculture, urban, water, desert, and barren. Desert and barren land covers were combined for ease of processing the two images. The 1985 image has an overall classification accuracy of 87% and the 2009 image has an accuracy of 85%. The accuracy of the data was assessed by creating regions of interest (ROI) that depict the actual land cover type of the image (e.g., ground truthing). Classification data within the ROIs are collected for actual sites, with the area in those sites compared to the output classification image for the entire image.

⁴ The region's small amount of land surface covered by water decreased during the period 1985–2009; however, the region's small water surface area fluctuates annually due to variable river flows in the Middle Rio Grande Basin, and decreased water area is not related to urbanization trends.

tions, and were recently used in the South Valley. The objective of this paper is to provide an overview of the strategic planning process used in the South Valley and outcomes of the process as applied to the future of the region's peri-urban irrigated agriculture. The information presented here will be of use to residents of other communities dealing with the challenges of peri-urban agriculture and the rural-to-urban transition.

THE STRATEGIC PLANNING PROCESS

Open Systems Framework

The search conference (SC) is the application of open systems theory (OST) to the process of strategic planning. Within the open systems framework, strategic planning involves searching and strategizing about the future. The SC strategic planning process has also been called the "Future Search," "Searching," or simply "the Search" (Large, 1998; Weisbord, 1992), and uses a temporary participative democratic organization that serves as a tool or method of cultural change (Emery, 1999). The search conference is an innovative model for addressing local agricultural issues because it creates an environment where people plan cooperatively toward a shared future and rise above individual and everyday purposes to search for a most desirable future. Collectively, participants in a search conference engage in creative task-oriented work that generates high levels of learning, positive communication, and energy (Alvarez and Emery, 2000). With respect to the South Valley search conference, the strategic planning effort developed linkages between knowledge of past and current events at both the global and local (e.g., South Valley) environments, and applied the knowledge to the future of local agriculture and agricultural water use.

A search conference is designed to help teams, organizations, or communities improve the way they address and solve problems and plan for the future. OST concepts provide the theoretical foundation of the process; however, it is made operational through a series of steps that involve extensive networking and communication. The steps recently taken in the South Valley are described as follows.

Selection of Participants

Potential search conference participants were selected through a South Valley community referencing process conducted between 2009 and 2012. Community referencing interviews were used to identify people knowledgeable about community agriculture and agricultural water use who were then asked to identify other knowledgeable people, thereby expanding the network of potential search conference participants. Community referencing is designed to engage participants in decision-making from the beginning of the search conference process because they know best who in their community should be involved (Wang, 2007).

The initial community referencing contacts were recommended by local Cooperative Extension Service personnel or were individuals who had had earlier interaction with New Mexico State University. The referencing process sought individuals who were well informed about agricultural issues in the South Valley and who believed that local agriculture contributes to economic development, food security, and quality of life. The individuals sought needed to be knowledgeable about local crop production, irrigation practices, and water resource issues, as well as informed about the functioning of local, state, and federal governments. Furthermore, the community referencing process attempted to identify respected individuals willing to commit time to the planning process, prepared to work collaboratively with a diverse group to improve South Valley agriculture viability, and concerned about the South Valley community's quality of life.

After initial contacts were identified, they nominated other community residents involved in agricultural and water issues who were less visible or not as broadly well known throughout the South Valley. Similar to community referencing results documented for previous search conferences, South Valley potential search conference participants could be and were nominated several times by different participants from very different walks of life (Diemer and Alvarez, 1995; Emery, 1999; Wang, 2007). The iterative community referencing process thus identified people the community believed have the knowledge and expertise to be involved in a search conference process, and was not dependent upon existing organizations and power structures for identification of knowledgeable or influential people (Emery, 1999).

The Search Conference

After potential strategic planning participants were identified through the iterative community referencing process, they were invited to participate in the formal search conference. This planning workshop was held at a centrally located facility in the South Valley in October 2012. About 80 planning participants were identified via the community referencing process. More than fifty were invited to the planning workshop, and about 20 invitees participated in the day-long search conference.

Tacit Knowledge

Tacit knowledge is knowledge resulting from individuals' unmediated perceiving of the world around them or picking up of information that has not been made explicit. Making tacit knowledge explicit requires recording and transmitting such information via language, signs, pictures, etc. (Polanyi, 1964). To build future scenarios for ever-changing environments, invariances must be picked up and tacit knowledge must be effectively communicated to others. People are aware of conditions in the world around them, and invariances are always there (Gibson, 1986). A search conference helps participants create new joint knowledge by communicating their tacit knowledge to others.

The tacitness of knowledge about the environment rests on an individual's acquaintance with that environment. Tacit knowledge is the simplest and best kind of knowledge. When people make their knowledge explicit they are verbalizing their awareness of invariances and communicating about them with others. In order for people to do this, they have to first be aware of the invariances in the environment and perceive them (Alvarez, 1999). When the focus of a search conference is on a social system with characteristics such as those of the South Valley—multicultural and neither rural nor urban—the emphasis is on finding out what tacit knowledge exists and how that knowledge can be translated into actions. This is a cognitive approach to decision-making.

Knowledge internal to and originating from the South Valley is critical if the diverse cultural ties and interests are to converge through activities and actions designed to improve local agricultural sustainability. A large part of the South Valley search conference workshop involved eliciting participants' tacit knowledge and their assessments of the

relevant external and internal environments. In the case of the South Valley, the external environments assessed by the search conference participants were the United States and the world and the Southwestern United States. The internal assessment focused on agriculture and water use in the South Valley.

The External Global and Regional Assessment

The external assessment conducted during the South Valley search conference workshop elicited knowledge about the realities and conditions of agriculture and water use issues from global and regional perspectives. The participants' external assessment discussion started with the act of scanning that was prompted with the question: In terms of agriculture and water use, what have you seen happen in the United States and the world in the last five to seven years that struck you as novel and significant? South Valley search conference participants' responses to the external assessment prompt question are summarized in Table 2.

External Global and Regional Scenarios Analysis

Scenarios analysis followed the workshop's external assessment scanning process. A scenario is a description or image of a future state, including considerations of major uncertainties encountered as a move toward the future is made. Scenarios inform decision-makers about what can happen under certain circumstances. They also encourage people to rigorously explore alternative images of the future and to determine the most desirable future they can construct for themselves (Bell, 1998).

Two scenarios were developed during the South Valley search conference: the most probable future and the most desirable future for the external U.S. and global environments. Each scenario had a prompting question and was discussed by small groups working simultaneously. The small groups presented their scenario outcomes to the larger group and all information was consolidated (Table 3).

Local South Valley Assessment

Next, the workshop's local South Valley assessment process was prompted with the following question presented to the search conference participants: In terms of agriculture and water use, what have you seen happen in the Southwestern region of

Table 2. Results of South Valley October 2012 Search Conference Participants' External Global and Regional Assessment

- States (OK, TX) and the Rio Grande region in legal battles over water
- Water over-appropriation everywhere
- Federal attempts to appropriate all surface water (Environmental Protection Agency)
- Innovative smart farm use of irrigation technology (i.e., drip)
- Manipulation, less than honest disclosure of water rights, use, transfers
- The “double dipping” problem—sell water rights, turn around to lease the water
- Globalization of food system leads to assumption “don’t need water in local agriculture”
- Globalization has driven some food prices down and negatively affected local agriculture
- Food prices rising
- Fuel prices increase leading to higher food prices
- Increasing GMO products that decrease chemical use
- Increasing average age of U.S. farmers
- Increasing GMO of food
- Younger people disconnected from the land
- Big companies buying water rights
- Use of satellite technology to do imagery/data collection
- Threats to potable water access
- Increasing food contamination (E. coli), hard to track
- Social/political movements in response to GMO food
- Decreasing funding for publicly supported assistance to agriculture
- Conversion of food production (corn) to non-food products (ethanol)
- Progression of desertification as a result of agricultural practices and climate change (loss of natural function)
- Farmers pushed out by water rights/economic changes
- Climate change
- Increasing interest in local food
- Water moving from agriculture to industry use
- Increasing market share of GMO products
- Privatization and marketing of water
- Increasing market value of organic products
- Increasing imports in general and food

Table 3. Results of South Valley October 2012 Search Conference Participants' External Global and Regional Scenarios Analysis

Most Probable Future: If things continue in the ways you have seen them happen, what is the most probable future of the U.S. and global environment in the year 2017?	Most Desirable Future: If things could be the way you want them to be, what is the most desirable future of the U.S. and global environment in the year 2017? What do you want it to be?
<ul style="list-style-type: none"> • More uncertainty about the weather <ul style="list-style-type: none"> - Less precipitation and hotter - Climate models still inaccurate - Increased drought and famine - Geographic shifts (south to north) of agricultural production given political and climate conditions • Increased fuel and goods/food costs • Increased poverty/obesity • Uncertainty about the future of bees and the negative impacts • Improved agricultural technology and research for big farmers (more crop per drop) <ul style="list-style-type: none"> - Cutting out small farmers - Increased water transfer from agriculture to industry - Decrease of local young farmers - Job loss - Possible increase in backyard farming • More government intervention and privatization in water rights and distribution with increased legal activity 	<ul style="list-style-type: none"> • Introduction of environmental and social policies: global institution vs. nations' standards • Strategies to initiate and continue agricultural production under hotter, drier conditions are implemented <ul style="list-style-type: none"> - Agriculture is sustainable (permaculture) - No net loss of agricultural land • Large increase in urban agriculture to address poverty, hunger, and access to healthy food/diet • Land banks established to provide affordable, accessible land to youth and community garden expansion • Work stamp program implemented • Elimination of agricultural policy that supports conversion of food grains to fuel • Commodity prices to sustain farmers and agriculture • Increased diversity in demographic trends of farming (age, sex, race) <ul style="list-style-type: none"> - Full employment opportunities for youth in agriculture • Water stays in watershed basin • Water for agriculture is protected • Increased efficiency of water use

the United States in the last five to seven years that struck you as novel and significant? Their responses are summarized in Table 4.

Local South Valley Scenarios Analysis

Again, the search conference participants were divided into two smaller groups to address the most probable future and most desirable future of the South Valley. Responses of the two groups were consolidated and are reported in Table 5.

The South Valley Internal Assessment

The next stage of the search conference workshop was an internal assessment focusing on historical events that lead to the current (2012) agriculture and water use situation in the South Valley. During the internal assessment, participants provided knowledge about the realities and conditions of local South Valley agriculture and water use issues. The internal assessment started with a history session initiated by the search conference participant who had lived in the area for the longest time and was prompted with the question: In terms of agriculture and water use in the South Valley, what lead you to the current state of affairs?

Identification of Strengths, Weaknesses, Opportunities, and Threats

Immediately after the historical internal assessment workshop session, agriculture and water issues in the South Valley were characterized by the participants in the form of a modified SWOT (strengths, weaknesses, opportunities, and threats identification) analysis as represented in Figure 1 and Table 6. The strengths are things that the SC participants agreed were working well and should continue to be done (KEEP). The weaknesses are things they noted were not working and should be gotten rid of (DISCARD). Some weaknesses were things that have not yet been done and need to be done in the community (CREATE).

The modified SWOT analysis is essential because the subsequent steps in the process of strategic planning derive from the issues identified during the SWOT analysis. This is more so with the “Create” list, which serves as an input to the creative generation of the desirable end state for agriculture

and water use issues to be identified in the SC, as well as possible strategies to overcome barriers. The history information and the modified SWOT analysis showed the truly unique resources and capabilities currently present in the South Valley, including the local irrigation district (the Middle Rio Grande Conservancy District, MRGCD).

Core competencies are resources and capabilities that are rare (possessed by few, or lacking by competitors), cannot be imitated, or are too costly for others to imitate. Core rigidities represent what the South Valley as a social system has been good at, but which are no longer supported by the external environment; thus, the rigidities do not represent a benefit anymore.

Agriculture and Water Use in the South Valley: Most Probable Future 2017

This stage of the search conference workshop involved participants developing a projection of the “business as usual” scenario (most probable future) for agriculture and water use in the South Valley. Planning participants were prompted with the following question: If you continue with business as usual, what does the South Valley look like in the year 2017? What is its most probable future?

Four small groups worked in parallel at the search conference workshop to develop the 2017 most probable future for South Valley agriculture. Small groups presented reports to the entire group and fielded questions for clarification and agreement from the larger group. The consolidated outcomes are presented in Table 7.

The most probable future scenario informs decision- and policymakers about what can happen should current circumstances continue in the South Valley. A “Californication” of the South Valley points at the urban sprawl phenomenon. Table 6 shows a small array of competencies (“Keep” list) and a large array of weaknesses (“Create” list) that will influence future conditions. After reviewing the qualitative data shown in Table 6, South Valley search conference workshop participants were encouraged to rigorously explore alternative images of the future and to determine the most desirable future they can construct for themselves as people whose quality of life, and that of the Albuquerque metropolitan area at large, is at stake.

Table 4. Results of South Valley October 2012 Search Conference Participants' Local South Valley Assessment

- | | |
|--|---|
| <ul style="list-style-type: none"> • Less access to water • Loss of agriculture culture • Loss of farm land to development • Increased development of space • Endangered species impact water use • Decreased water availability for farmers | <ul style="list-style-type: none"> • Increased legal disputes about GMOs • Big companies' rights (patents, etc.) disputes given cross breeding of seeds (problem protecting own crops) • Increased small-scale farmers in peri-urban areas • Increased efficiencies of water delivery/use |
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Table 5. Results of South Valley October 2012 Search Conference Participants' Local South Valley Scenarios Analysis

Most Probable Future: If things continue in the ways you have seen them happen, what is the most probable future of the Southwest in the year 2017?	Most Desirable Future: If things could be the way you want them to be, what is the most desirable future of the Southwest in the year 2017? What do you want it to be?
<ul style="list-style-type: none"> • Increasing imports of food • Big, old farms are being subdivided • Corporatization of farms <ul style="list-style-type: none"> - Increased development of agriculture labs, particularly in urbanized areas - Increased monoculture crop production - Increased invasive, undesirable plants • Crop shift by necessity—new opportunities (increased crop diversity, including grapes) • Increased transfer of water rights to cities • Rural areas urbanized—population shift urban to rural • Increased small farms and gardens • Continued drought conditions lead to decreased water supply for agriculture <ul style="list-style-type: none"> - More legal challenges - Increased impacts—positive and negative (more negative)—on current irrigation system - Increased restrictions/regulation on agricultural livestock (Bernalillo County ordinance) 	<ul style="list-style-type: none"> • Governing bodies are implementing locally based land use plans that reflect rural agricultural values <ul style="list-style-type: none"> - Increased local government support for small farms - Smart development policies have been developed and implemented - Increased awareness (education) of importance of agriculture to health, culture, etc. - More pro-farm policies from local governments - More mentoring of young farmers, more appreciation for farmers • Ag institutions at cutting edge of new technologies and techniques • Existing ag support initiatives are available to very small farmers (USDA) • Development of more pro-production, value-added agriculture infrastructure • Reexamination of how government supports maintenance of open spaces, including harmonization of agriculture and environment concerns • Improvements made to water delivery infrastructure <ul style="list-style-type: none"> - Fair and equitable water for irrigation - Conservation practices have been fully optimized - Minimized use of irrigation water for non-ag purposes (lawns) - Increased storage of water at high-altitude reservoirs to reduce evaporated losses (RG compact)

Agriculture and Water Use in the South Valley: Most Desirable Future 2017

The next step in the planning process was developing the 2017 most desirable future for agriculture and water use in the South Valley. Workshop participants were prompted with the following question: In terms of agriculture and water use, what do you want the South Valley to look like in the year 2017? What is the most desirable future for the South Valley?

Three randomly selected groups worked on this task simultaneously. Each group was asked to de-

velop a future scenario in five to six concise statements describing the most desirable 2017 state. Small group reports, questions for clarification and agreement, and consolidation of statements from all workshop participants followed.

After consolidation of desirable future statements, barriers to achieving the desirable future were identified. Finally, self-selected groups around desirable statements worked on matching barriers to desirable statements and initiated the strategy work. After preliminary strategy work, desirable future statements became the 2017 strategic goals. Outcomes are presented in Table 8.

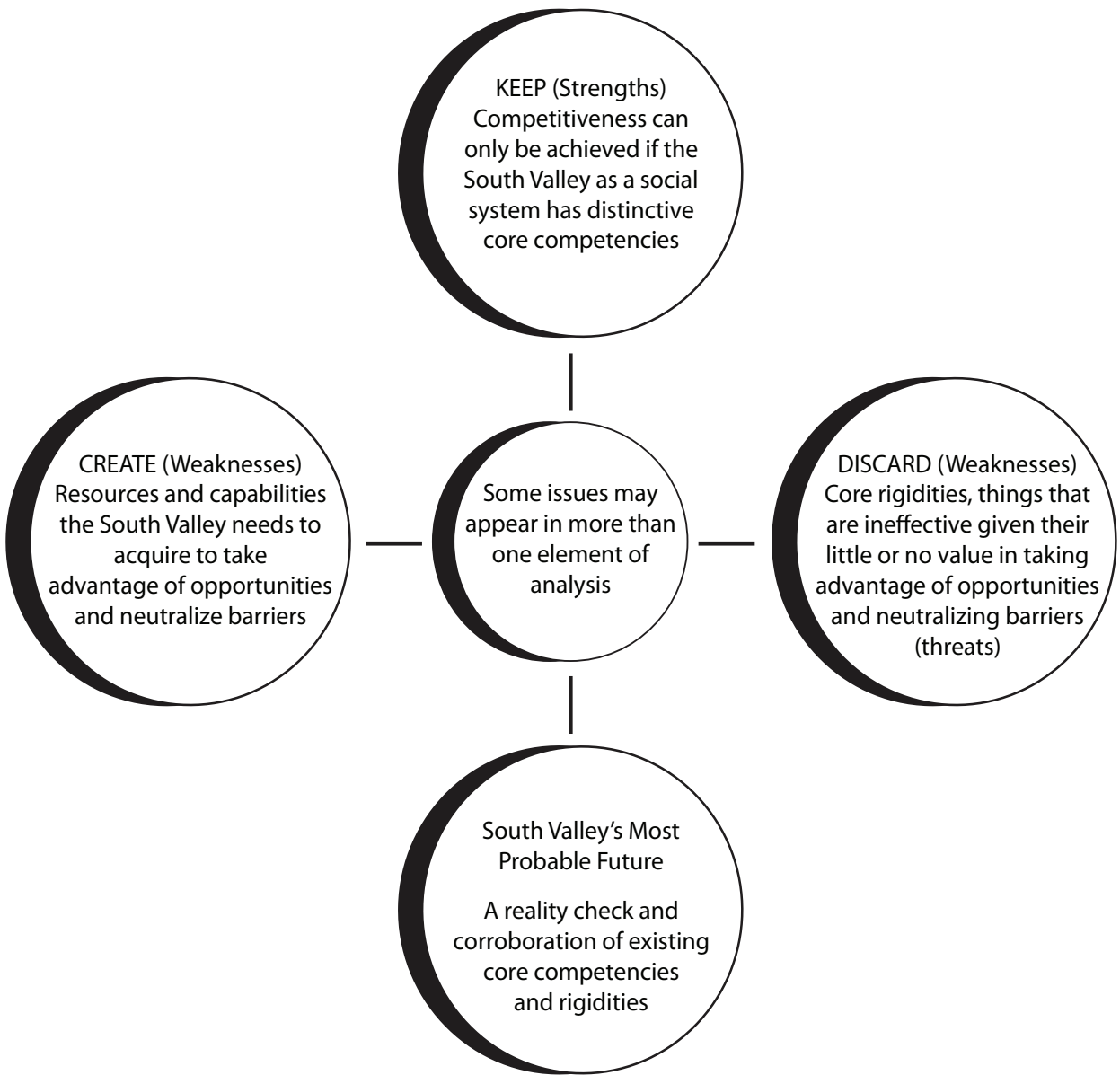


Figure 1. Representation of a modified SWOT analysis applied to South Valley agriculture and agricultural water use.

Table 6. Results of South Valley October 2012 Search Conference Participants’ Modified SWOT Analysis of South Valley Agriculture and Agricultural Water Use

Keep	Discard	Create
<ul style="list-style-type: none"> • MRGCD (Middle Rio Grande Conservancy District) delivery system • Informal community system • Individual water rights and acequia associations (community groups) • Process of developing sector plans • Local Economic Development Act (LEDA) 	<ul style="list-style-type: none"> • County Commission/MRGCD counting rooftops as unfertile spaces • MRGCD unpredictable water delivery system • Not being able to access water when it’s in main ditch—access granted a month later for some • Lack of knowledge of how MRGCD works • Blocked ditches • Downstream/upstream water transfers • Lack of trust and misunderstanding of what sector plans are • Developers driving higher-density housing • Special land permits 	<ul style="list-style-type: none"> • Policies encouraging one dwelling per acre • Policies that connect land use to actual water delivery system • Increased access to delivery system • Formalize community irrigation systems • A way to allow water rights to stay with their owners • Enforce 1935 contracts (MRGCD) • Information system (MRGCD) • Predictable system of water delivery • Equitable water distribution • Functional agricultural irrigation system • More access to off-season irrigation water • Effective system to enforce water irrigation rights versus leasing • Possibility for crop rotation irrigation • Distinct by area sector plans • Sector plans that require education (people lose track of goals) • Grassroots efforts to put pressure on politicians to work for the common good • An educational approach about agriculture for incoming political leaders • Appropriate application of LEDA

Table 7. Results of South Valley October 2012 Search Conference Participants’ Assessment of South Valley’s Most Probable Agriculture and Water Use Future

<ul style="list-style-type: none"> • South Valley “Californication” • Increased housing/commercial development pushing more agricultural lands down south while more water is transferred to the north • No real change or improvement to political system—pro-development politicians continue in office 	<ul style="list-style-type: none"> • Less water available for farming • Loss of large farms but more small-scale, specialized agriculture (greenhouses) • Fewer people wanting to farm because of water shortage • Loss of farmland, increased hay prices, and less livestock • Losses to aquifer recharge and habitats • Decrease in federal subsidies 	<ul style="list-style-type: none"> • MRGCD keeps irrigation system • An improved irrigation water delivery system with more efficiency (increased drip irrigation) but with decreased water use efficiency and increased water delivery fees • Water battles between user groups • More money going to attorney’s fees during water battles • Development of acequia associations
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Table 8. South Valley Agriculture and Water Use: 2017 Strategic Goals, Barriers, and Strategies Identified by October 2012 Search Conference Participants

Goal Statement and Actions	Corresponding Barriers	Strategies
<p>Develop a community-supported sector plan to guide development.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Develop government policies to support agriculture and acequias • Further explore/research agricultural districts and how they apply within the South Valley 	<ul style="list-style-type: none"> • People outside not believing goals are desirable • Commercial developers • Existing laws/regulations • Lack of willingness to cooperate and talk to each other • Lack of understanding of current state of water issues • Different world views • Not including business community 	<ol style="list-style-type: none"> 1. Develop need statement for sector plan/ agriculture district 2. Outreach/education about value of agriculture and ditch system to larger community (beyond direct users) 3. Identify gap in community that can be filled by agriculture 4. Utilize open space properties with irrigation and farming to demonstrate links with irrigation, wildlife, aquifer recharge, recreation, and food production
<p>Develop a predictable and equitable water delivery system.</p> <p>Actions:</p> <ul style="list-style-type: none"> • MRGCD develops a clear and equitable distribution system • MRGCD develops standardized practices of water distribution in the South Valley with professional ditch riders • Develop effective coordination between MRGCD, Office of State Engineer (OSE), and water users • Develop a county/government/MRGCD responsive relationship 	<ul style="list-style-type: none"> • Existing laws/regulations • Predicted decreasing water availability • Lack of understanding of current state of water issues 	<ol style="list-style-type: none"> 1. Identify cropping patterns and amount of irrigated land 2. More ditch riders, training, and mentoring 3. Increased monitoring measurement (Landsat) 4. Better information to water users 5. Merger and quality control of MRGCD and OSE water right files
<p>Develop a flexible irrigation water delivery schedule accounting for both crop and system needs.</p>	<p>None listed</p>	<ol style="list-style-type: none"> 1. Follow chain of command when making requests; if that fails, go to MRGCD board meeting with facts, figures, data, and needs 2. Individual effort first 3. Collect good data (handout OK) 4. Get help with data collection as required
<p>Develop a collaborative production and marketing system that respects and supports independent farming attitudes and freedom.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Develop an Albuquerque farmers marketing system that is 24/7 (full-time) • Improve marketing networks (e.g., virtual bulletin board) • Expand co-ops, training, and marketing • Develop farm-to-school programs and projects • Develop conjunctive surface and groundwater irrigation methods 	<ul style="list-style-type: none"> • Existing laws/regulations • Lack of willingness to cooperate and talk to each other • Lack of understanding of current state of water issues • Different world views 	<ol style="list-style-type: none"> 1. Provide assistance/training to help people develop cooperative ventures 2. Negotiate with Albuquerque Public Schools to lower barriers for farm-to-school (especially for micro producers) 3. Expand/advertise land link; place info in feed store, plant nurseries, etc. 4. Get exposure through public access, TV, radio, etc.
<p>Establish prioritized ways to keep water in the South Valley.</p> <p>Action:</p> <ul style="list-style-type: none"> • Develop stronger community networks and relationships 	<p>No work done</p>	

QUALITATIVE SYNTHESIS OF STRATEGIC PLANNING OUTCOMES

Qualitative data from the October 2012 South Valley agriculture and water use search conference are summarized in Figure 2. At the global and local environment levels, the outcomes of the strategic planning show that urban development pressures will continue to bring more external pressures to the South Valley community. A related issue is the movement of water to non-agricultural use with a consequent loss to farming and agricultural water use. There is also an increase in drought, famine, and obesity. In addition, there are concerns about climate change with an emphasis on the uncertainty brought about by the inaccuracy of existing climate models.

Closer to home, the South Valley appears to have some opportunities. Urbanization, increasing regulation of agriculture and livestock production combined with continued drought conditions, and increased transfer of water rights to cities all appear to contribute to innovative approaches to farming. By necessity, there is an increase in crop diversity and new opportunities for producing food at the small farm and garden levels. However, this solution to food production remains small relative to the total market and has been occurring simultaneously with increased food imports (Brooks et al. 2009).

At the internal assessment level (i.e., the South Valley area), the outcomes of the strategic planning work show that although a few desirable things are happening with respect to South Valley agriculture and water use, there are many barriers and many things that are lacking. Two predominant barriers are the approach to housing and commercial development and the water management practices of the Middle Rio Grande Conservancy District (MRGCD). Developers are perceived to be driving higher-density housing and commercial development resulting in the “Californication” of the South Valley. This is characterized by increased housing and commercial development that is pushing agriculture out of the region and decreasing farm size while more water is transferred to the north. This is perceived to be a problem generated by a political environment that is more pro-development than pro-agriculture.

The “Californication” of the South Valley can only worsen the lack of appreciation for agriculture. The United States census definition of a farm is any place

from which \$1,000 or more of agricultural products are produced and sold during the census year. As Holmes (2011) observes, this definition disqualifies many small farms from being enumerated in the Census of Agriculture and from being included in input-output economic analysis, thereby making it difficult or impossible to assess the true economic impact of South Valley agriculture.

The MRGCD has improved the region’s overall water delivery systems; however, water use efficiency in the region appears to be relatively low. Irrigation water delivery is perceived as difficult to predict, not equitable, and unfriendly to many irrigators. There appears to be little or no access to off-season irrigation and no room for irrigation according to crop needs. In addition, MRGCD appears to fall short of enforcing 1935 water rights contracts, and is perceived to not fairly manage delivery of water to those who have water rights. Part of the problem appears to be a lack of knowledge of how MRGCD works.

There appears to be limited competence in the South Valley to deal with the ever-changing conditions of agriculture and water use in the Albuquerque metropolitan area. In terms of South Valley residents’ quality of life and from the projection of business-as-usual (the South Valley’s most probable future), several maladaptive strategies can be identified (Table 9).

Strategies are maladaptive when they actually lessen the opportunity for learning and the probability of reducing uncertainty under ever-changing conditions (Emery, 1977; Alvarez, 1999). The active forms of maladaptation are the prerogative of those with decision-making power and who have the power to change social arrangements. Passive maladaptive strategies are pursued by others as they adjust and react to changes driven by those in power.

The internal sources of South Valley maladaptive strategies can be more specifically identified with the “Discard” or existing weaknesses list, as well as the barriers to achieving the 2017 South Valley agriculture and water use strategic goals. External sources come from the global and local environments. They come in the form of strategies derived from outside experience, i.e., what others outside the South Valley have done. These strategies can be pursued in the South Valley without realizing that, in the longer run, such strategies will not work.

Analysis of the qualitative data from the search conference workshop indicates that there is a strong

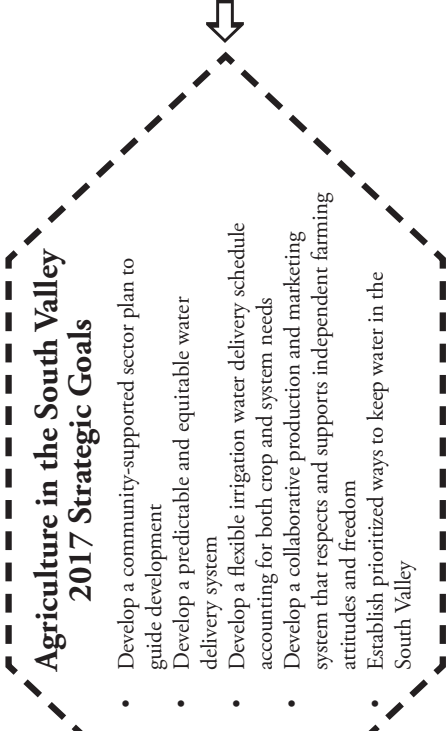
**South Valley's 2017
Most Probable Future
Keep (current strengths)
Create (what is lacking,
weaknesses)**

Barriers to Overcome

- People outside not believing goals are desirable
- Commercial developers
- Existing laws/regulations
- Prediction of decreasing water availability
- Lack of willingness to cooperate and talk to each other
- Lack of understanding of current state of water issues
- Different world views
- Not including business community

Discard

- County Commission/MRGCDD counting rooftops as infertile spaces
- MRGCDD unpredictable delivery system
- Downstream/upstream water transfers
- Blocking ditches
- Lack of knowledge of how MRGCDD works
- Not being able to access water when in main ditch—access granted a month later for some
- Lack of trust and misunderstanding of what sector plans are
- Special land permits
- Developers driving higher-density housing



Most Probable Global Future

- More uncertainty about the weather:
 - Less precipitation and hotter
 - Climate models still inaccurate
 - Increased drought and famine
 - Geographic shifts (south to north) of agricultural production given political and climate conditions
- Increased fuel and goods/food costs
- Increased poverty/obesity
- Uncertainty about the future of bees/negative impacts
- Improved agricultural technology and research for big farmers (more crop per drop):
 - Cutting out small farmers, job loss
 - Increased water use from agriculture to industry
 - Decrease of local young farmers
 - Possible increase in backyard farming
- More government intervention and privatization in water rights and distribution with increased legal activity

Most Probable South-west Region Future

- Increasing imports of food
- Big, old farms are being subdivided
- Corporatization of farms:
 - Increased development of agriculture labs, particularly in urbanized areas
 - Increased monocrop production
 - Increased invasive, undesirable plants
- Crop shift by necessity—new opportunities (increased crop diversity, including grapes)
- Increased transfer of water rights to cities
- Rural areas urbanized—population shift, urban to rural
- Increased small farms and gardens
- Continued drought conditions lead to decreased water supply for agriculture:
 - More legal challenges
 - Increased impacts, positive and negative (more negative), to current irrigation system
- Increased restrictions/regulation on agricultural livestock (Bernalillo Co. ordinance)

Figure 2. Representation of a modified SWOT analysis applied to South Valley agriculture and agricultural water use.

Table 9. Maladaptive Strategies for Dealing with the South Valley’s Futures

Statement	Choice Parameter	Maladaptive Strategy	
		Passive	Active
<ul style="list-style-type: none"> • No real change or improvement to political system—pro-development politicians continue in office • Increased housing/commercial development pushes more agricultural lands down south while more water is transferred to the north • Water battles between user groups • More money going to attorney’s fees 	<p>Probability of choice—the probability that such choice can be successful is very low. To be successful, connection must be made to human rather than non-human resources.</p>	<p>Segmentation—us (people who care about agriculture) and them (people who care about urban development only) syndrome</p>	<p>Law and order—an authoritarian form of behavior that acts to bring divided groups back to order with the more powerful winning the battles</p>
<ul style="list-style-type: none"> • Fewer people wanting to farm because of water shortage 	<p>Probable effectiveness— success increases when effectiveness is measured in terms of human development for all</p>	<p>Dissociation—water use decision-makers reject working with farmers, they make autonomous decisions</p>	

lack of connection between human resources within the South Valley. For example, there appears to be a lack of knowledge of how MRGCD works. There is little or no understanding of why water cannot be accessed when it is readily available in the main ditch. In addition, there is a perceived lack of predictability in the water delivery system. These behaviors are in direct correspondence to the active maladaptive strategies of social engineering whereby decisions, whether implicitly or explicitly, are to be overcome by powerless water users by adopting technologically biased strategies.

Technologically biased strategies are in direct opposition to active adaptive strategies that strive to develop human resources without subordination to institutions or technologies. The wellbeing of people is the measure of success in active adaptive strategies. It is thus not surprising that some opposition emerged among search conference participants when agricultural districts (e.g., new bureaucracies) were thought of as the means to deal with South Valley agricultural issues.

It is important to note that despite the array of problems identified with the way MRGCD works, strategic planning workshop participants see the institution as logically managing water resources in the region. However, an array of items needs to be created in order to improve South Valley agricultural irrigation.

At the external level, both the global and task environments bring more light to the lack of strategies that embrace the ideal of humanity. The projected scenario shows an environment where people are increasingly poor, obese, losing their jobs, growing food in their backyards, etc. At the U.S. and South-west regional levels there is an increasing dependency on imported food, environmental damage, and more legal battles. Much more can be said about the maladaptive strategies coming from the external environments, and it is beyond the scope of this report to address all of these issues. Suffice it to say that successful South Valley agriculture and water use strategic goal implementation will depend on the level of active adaptive strategies adopted within the community.

CONCLUSION

Numerous studies have demonstrated the effectiveness and power of the search conference (Wang, 2007). Search conference methodology provides a participatory action framework within which a community (peri-urban or otherwise) can examine their history, develop a vision for their future, inventory their available assets, and catalog obstacles they believe will impair their ability to foster growth and wealth creation within their community. Community assets typically include natural

resources, economic capital, human skills and abilities, and social capital (Reimer, 2006). Obstacles may include various resource limitations as well as institutional barriers. Search conferencing provides a setting where community members with disparate perspectives work together outside the boundaries of existing social and political entities, and is very appropriate for communities undergoing rapid transition and socio-political restructuring.

An October 2012 search conference held in New Mexico's South Valley elicited extensive tacit knowledge from the workshop participants, and developed a framework or a roadmap for achieving the most desirable future for South Valley agriculture and agricultural water use. What this future will look like is entirely up to the agricultural community in the area. It is clear, however, that South Valley citizens are concerned about their community and want to see it successfully navigate through the peri-urban transition.



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